

## **IN THE CLAIMS**

This listing of claims will replace all prior versions, and listings, of claims in the application. An identifier indicating the status of each claim is provided.

### **Listing of Claims**

1-43. (Canceled)

44. (New) An information transmitting apparatus which transmits a plurality of signals, said signals including at least video signals and audio signals, to an information receiving apparatus, said information transmitting apparatus comprising:

a plurality of encoding means for separately encoding each of said video signals and each of said audio signals;

first multiplexing means for multiplexing a plurality of pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal;

second multiplexing means for multiplexing the multiplexed plurality of pairs of encoded video signals and encoded audio signals; and

control means for controlling a multiplexing ratio among the plurality of signals in the second multiplexing means, controlling a video data occupation bandwidth, an audio data occupation bandwidth, and a program data occupation bandwidth in relation to a transmission channel bandwidth,

wherein the information receiving apparatus reads contents of a program information data of a current program and a next program at a re-transmission cycle of the

program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules, and

wherein said control means controls said multiplexing ratio to enable acquisition of program information in a reduced period of time by increasing transmission of program data when transmission of video data and audio data can be decreased.

45. (New) The information transmitting apparatus according to claim 44, wherein the transmitting apparatus transmits the plurality of signals as a single transport stream.

46. (New) The information transmitting apparatus according to claim 44, further comprising database means for providing data that relates to transmission rates of the plurality of signals at each time point, wherein the control means controls the multiplexing ratio while referring to the database means.

47. (New) The information transmitting apparatus according to claim 44, wherein the control means controls an output rate of each of the plurality of encoding means.

48. (New) The information transmitting apparatus according to claim 44, wherein the plurality of signals further comprise program information.

49. (New) An information transmitting apparatus which transmits program information to an information receiving apparatus, said information transmitting apparatus comprising:

a plurality of video encoding means for encoding each video signal;  
a plurality of audio encoding means for encoding each audio signal;  
program information data generating means for generating data of the program information;

first multiplexing means for multiplexing the data of the program information that is output from the program information data generating means with encoded video data that is output from the plurality of video encoding means and encoded audio data that is output from the plurality of audio encoding means in order to form pairs of multiplexed data;

second multiplexing means for multiplexing the pairs of multiplexed encoded video data, encoded audio data and data of the program information; and

control means for controlling a data output rate of each of the plurality of video encoding means, a data output rate of each of the plurality of audio encoding means, a data output rate of the program information data generating means, and a multiplexing ratio among the encoded video data, the encoded audio data, the data of the program information in the second multiplexing means, a video data occupation bandwidth, an audio data occupation bandwidth, and a program data occupation bandwidth in relation to a transmission channel bandwidth,

wherein the information receiving apparatus reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules, and

wherein said control means controls said multiplexing ratio to enable acquisition of program information in a reduced period of time by increasing transmission of program data

when transmission of video data and audio data can be decreased.

50. (New) An information transmitting method for transmitting a plurality of signals, said signals including at least video signals and audio signals, to an information receiving apparatus, said information transmitting method comprising:

an encoding step for separately encoding each of said video signals and each of said audio signals;

a first multiplexing step for multiplexing a plurality of pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal;

a second multiplexing step for multiplexing the multiplexed plurality of pairs of encoded video signals and encoded audio signals;

a control step for controlling a multiplexing ratio among the plurality of signals in the second multiplexing step, a video data occupation bandwidth, an audio data occupation bandwidth, and a program data occupation bandwidth in relation to a transmission channel bandwidth; and

a receiving step wherein the information receiving apparatus receives the plurality of signals, reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules,

wherein said control step controls said multiplexing ratio to enable acquisition of program information in a reduced period of time by increasing transmission of program data when transmission of video data and audio data can be decreased.

51. (New) The information transmitting method according to claim 50, wherein the control step controls the multiplexing ratio while referring to data that relates to transmission rates of the plurality of signals at each time point.

52. (New) The information transmitting method according to claim 50, wherein the plurality of signals are further comprise program information.

53. (New) An information transmitting method for transmitting program information to an information receiving apparatus, said information transmitting method comprising:

a video encoding step of encoding each video signal of each of a plurality of video encoding means;

an audio encoding step of encoding each audio signal of each of a plurality of audio encoding means;

a program information data generating step of generating data of the program information;

a first multiplexing step of multiplexing the data of the program information that is output by the program information data generating step with encoded video data that is output by the video encoding step and encoded audio data that is output by the audio encoding step in order to form pairs of multiplexed data;

a second multiplexing step for multiplexing the pairs of multiplexed encoded video data, encoded audio data and multiplexed data of the program information;

a control step of controlling a data output rate of each of the plurality of video encoding means in the video encoding step, a data output rate of each of the plurality of audio encoding means in the audio encoding step, a data output rate of the program information data generating step, a multiplexing ratio among the encoded video data, the encoded audio data, and the data of the program information in the second multiplexing step, a video data occupation bandwidth, an audio data occupation bandwidth, and a program data occupation bandwidth in relation to a transmission channel bandwidth;

an acquiring step of acquiring electronic program guide data, at the information receiving apparatus, only during a data transfer rate increase period; and

a receiving step wherein the information receiving apparatus receives the encoded video data, the encoded audio data, and the data of the program information, reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules,

wherein said control step controls said multiplexing ratio to enable acquisition of program information in a reduced period of time by increasing transmission of program data when transmission of video data and audio data can be decreased.

54. (New) A computer-readable medium adapted to store a computer program for causing an information transmitting apparatus to transmit a plurality of signals, said signals including at least video signals and audio signals, to an information receiving apparatus, the program comprising:

an encoding step for separately encoding each of said video signals and each of

said audio signals;

a first multiplexing step for multiplexing a plurality of pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal;

a second multiplexing step for multiplexing the multiplexed plurality of pairs of encoded video signals and encoded audio signals;

a control step for controlling a multiplexing ratio among the plurality of signals in the second multiplexing step, a video data occupation bandwidth, an audio data occupation bandwidth, and a program data occupation bandwidth in relation to a transmission channel bandwidth;

an acquiring step for acquiring electronic program guide data, at the information receiving apparatus, only during a data transfer rate increase period; and

a receiving step wherein the information receiving apparatus receives the plurality of signals, reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules,

wherein said control step controls said multiplexing ratio to enable acquisition of program information in a reduced period of time by increasing transmission of program data when transmission of video data and audio data can be decreased.

55. (New) The provider according to claim 54, wherein the control step controls the multiplexing ratio while referring to data that relates to transmission rates of the plurality of signals at each time point.

56. (New) The provider according to claim 54, wherein the plurality of signals are further comprise program information.

57. (New) A computer-readable medium adapted to store a computer program for causing an information transmitting apparatus to transmit program information to an information receiving apparatus, the program comprising:

a video encoding step of encoding each video signal of each of a plurality of video encoding means;

an audio encoding step of encoding each audio signal of each of a plurality of audio encoding means;

a program information data generating step of generating data of the program information;

a first multiplexing step of multiplexing the data of the program information that is output by the program information data generating step with encoded video data that is output by the video encoding step and encoded audio data that is output by the audio encoding step in order to form pairs of multiplexed data;

a second multiplexing step for multiplexing the pairs of multiplexed encoded video data, encoded audio data and data of the program information;

a control step of controlling a data output rate of each of the plurality of video encoding means in the video encoding step, a data output rate of each of the plurality of audio encoding means in the audio encoding step, a data output rate of the program information data generating step, and a multiplexing ratio among the encoded video data, the encoded audio data,



the data of the program information in the second multiplexing step, a video data occupation bandwidth, an audio data occupation bandwidth, and a program data occupation bandwidth in relation to a transmission channel bandwidth;

an acquiring step of acquiring electronic program guide data, at the information receiving apparatus, only during a data transfer rate increase period; and

a receiving step wherein the information receiving apparatus receives the encoded video data, the encoded audio data, and the data of the program information, reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules,

wherein said control step controls said multiplexing ratio to enable acquisition of program information in a reduced period of time by increasing transmission of program data when transmission of video data and audio data can be decreased.

58. (New) An information receiving apparatus which receives multiplexed program information that is comprised of a plurality of multiplexed pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal, said information receiving apparatus comprising:

acquiring electronic program guide data only during a data transfer rate increase period;

separating means for separating the multiplexed program information;

a plurality of decoding means for separately decoding each of the video signals and each of the audio signals;

storing means for storing the program information separated by the separating means; and

control means for controlling a data acquisition time and for controlling operations of the separating means and the storing means in accordance with a transmission rate of the program information and the data acquisition time,

wherein the information receiving apparatus reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules, and

wherein said control means enables acquisition of program information in a reduced period of time by increasing reception of program data when transmission of video data and audio data have been decreased.

59. (New) An information receiving method for receiving program information that is comprised of a plurality of multiplexed pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal, said information receiving method comprising:

an acquiring step for acquiring electronic program guide data only during a data transfer rate increase period;

a separating step for separating the multiplexed program information;

a decoding step for separately decoding each of the video signals and each of the audio signals;

a storing step for storing the program information separated by the separating

step;

a control step for controlling a data acquisition time and for controlling operations of the separating step and the storing step in accordance with a transmission rate of the program information and the data acquisition time; and

a receiving step wherein the information receiving apparatus receives the plurality of multiplexed encoded signals, reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules,

wherein said control means enables acquisition of program information in a reduced period of time by increasing reception of program data when transmission of video data and audio data have been decreased.

60. (New) A computer-readable medium adapted to store a computer program for causing an information receiving apparatus to receive program information that is comprised of a plurality of multiplexed pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal, the program comprising:

an acquiring step for acquiring electronic program guide data only during a data transfer rate increase period;

a separating step for separating the multiplexed program information;

a decoding step for separately decoding each of the video signals and each of the audio signals;

a storing step for storing the program information separated by the separating

step;

a control step for controlling a data acquisition time and for controlling operations of the separating step and the storing step in accordance with a transmission rate of the program information and the data acquisition time; and

a receiving step wherein the information receiving apparatus receives the plurality of multiplexed pairs of encoded signals, reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules, and

wherein said control means enables acquisition of program information in a reduced period of time by increasing reception of program data when transmission of video data and audio data have been decreased.

61. (New) A broadcasting system having an information transmitting apparatus which transmits program information to an information receiving apparatus which receives multiplexed program information comprised of a plurality of multiplexed pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal,

the information transmitting apparatus comprising:

a plurality of video encoding means for encoding each video signal;

a plurality of audio encoding means for encoding each audio signal;

program information data generating means for generating data of the program information;

first multiplexing means for multiplexing the data of the program information that is output from the program information data generating means with encoded video data that is output from the plurality of video encoding means and encoded audio data that is output from the plurality of audio encoding means in order to form pairs of multiplexed data;

second multiplexing means for multiplexing the pairs of multiplexed encoded video data, encoded audio data and data of the program information; and

control means for controlling a data output rate of each of the plurality of video encoding means, a data output rate of each of the plurality of audio encoding means, a data output rate of the program information data generating means, and a multiplexing ratio among the encoded video data, encoded the audio data, the data of the program information in the second multiplexing means a video data occupation bandwidth, an audio data occupation bandwidth, and a program data occupation bandwidth in relation to a transmission channel bandwidth, and

the information receiving apparatus comprising:

acquiring means for acquiring electronic program guide data only during a data transfer rate increase period;

separating means for separating the multiplexed program information;

a plurality of decoding means for separately decoding each of the video signals and each of the audio signals;

storing means for storing the program information separated by the separating means; and

control means for controlling operations of the separating means and the storing means in accordance with a transmission rate of the program information,

wherein the information receiving apparatus reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules, and

wherein said control means of said information transmitting apparatus controls said multiplexing ratio to enable acquisition of program information in a reduced period of time by increasing transmission of program data when transmission of video data and audio data can be decreased.

62. (New) An information transmitting apparatus which transmits program information to an information receiving apparatus, said information transmitting apparatus comprising:

program information data generating means for generating program information data including information of a transmission status of the program information;

first multiplexing means for multiplexing the program information data generated by the program information data generating means with a plurality of pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal; and

second multiplexing means for multiplexing the multiplexed plurality of pairs of encoded video signals and encoded audio signals;

control means for controlling a video data occupation bandwidth, an audio data occupation bandwidth, and a program data occupation bandwidth in relation to a transmission channel bandwidth,

wherein the information receiving apparatus reads contents of a program

information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules, and

wherein said control means controls said program data occupation bandwidth to enable acquisition of program information in a reduced period of time by increasing transmission of program data when the transmission of video data and audio data can be decreased.

63. (New) An information transmitting method for transmitting program information to an information receiving apparatus, said information transmitting method comprising:

a program information data generating step for generating program information data including information of a transmission status of the program information;

a first multiplexing step for multiplexing the program information data generated by the program information data generating means with a plurality of pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal; and

a second multiplexing step for multiplexing the multiplexed plurality of pairs of encoded video signals and encoded audio signals;

a control step of controlling a video data occupation bandwidth, an audio data occupation bandwidth, and a program data occupation bandwidth in relation to a transmission channel bandwidth; and

a receiving step wherein the information receiving apparatus receives the multiplexed plurality of pairs of encoded video signals and encoded audio signals, reads contents of a program information data of a current program and a next program at a re-transmission cycle

of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules, and

wherein said control step controls said program data occupation bandwidth to enable acquisition of program information in a reduced period of time by increasing transmission of program data when transmission of video data and audio data can be decreased.

64. (New) A computer-readable medium adapted to store a computer program for causing an information transmitting apparatus to transmit program information to an information receiving apparatus, said program comprising:

a program information data generating step for generating program information data including information of a transmission status of the program information;

a first multiplexing step for multiplexing the program information data generated in the program information data generating means with a plurality of pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal; and

a second multiplexing step for multiplexing the multiplexed plurality of pairs of encoded video signals and encoded audio signals;

a control step for controlling a video data occupation bandwidth, an audio data occupation bandwidth, and a program data occupation bandwidth in relation to a transmission channel bandwidth; and

a receiving step wherein the information receiving apparatus receives the multiplexed plurality of pairs of encoded video signals and encoded audio signals, reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a



transmission status of the program information data indicating broadcast schedules,

wherein said control step controls said program data occupation bandwidth to enable acquisition of program information in a reduced period of time by increasing transmission of program data when transmission of video data and audio data can be decreased.

65. (New) An information receiving apparatus which receives multiplexed program information that is comprised of a plurality of multiplexed pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal, said information receiving apparatus comprising:

acquiring means for acquiring electronic program guide data only during a data transfer rate increase period;

separating means for separating the multiplexed program information;

a plurality of decoding means for separately decoding each of the video signals and each of the audio signals;

extracting means for extracting information of a transmission status of the program information that is included in the program information data separated by the separating means; and

control means for controlling a data acquisition time and for controlling operations of the separating step in accordance with a transmission rate of the program information and the data acquisition time,

wherein the information receiving apparatus reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a

transmission status of the program information data indicating broadcast schedules, and

wherein said control means enables acquisition of program information in a reduced period of time by increasing reception of program data when transmission of video data and audio data have been decreased.

66. (New) An information receiving method for receiving multiplexed program information comprised of a plurality of multiplexed pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal, said information receiving method comprising:

an acquiring step for acquiring electronic program guide data only during a data transfer rate increase period;

a separating step for separating the multiplexed program information;

a decoding step for separately decoding each of the video signals and each of the audio signals; and

an extracting step for extracting information of a transmission status of the program information that is included in the program information data separated by the separating step;

a control step for controlling a data acquisition time and for controlling operations of the separating step in accordance with a transmission rate of the program information and the data acquisition time; and

a receiving step wherein the information receiving apparatus receives the plurality of multiplexed pairs of encoded signals, reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data

of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules,

wherein said control step enables acquisition of program information in a reduced period of time by increasing reception of program data when transmission of video data and audio data have been decreased.

67. (New) A computer-readable medium adapted to store a computer program for causing an information receiving apparatus to receive multiplexed program information comprised of a plurality of multiplexed pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal, the program comprising:

an acquiring step for acquiring electronic program guide data only during a data transfer rate increase period;

a separating step for separating the multiplexed program information;

a decoding step for separately decoding each of the video signals and each of the audio signals; and

an extracting step for extracting information of a transmission status of the program information that is included in the program information data separated by the separating step;

a control step for controlling a data acquisition time and for controlling operations of the separating step in accordance with a transmission rate of the program information and the data acquisition time; and

a receiving step wherein the information receiving apparatus receives the plurality of multiplexed pairs of encoded signals, reads contents of a program information data of a

current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules,

wherein said control step enables acquisition of program information in a reduced period of time by increasing reception of program data when transmission of video data and audio data have been decreased.

68. (New) A broadcasting system having an information transmitting apparatus which transmits program information to an information receiving apparatus which receives multiplexed program information comprised of a plurality of multiplexed pairs of encoded signals, each pair of encoded signals having one encoded video signal and one encoded audio signal,

the information transmitting apparatus comprising:

program information data generating means for generating program information data including information of a transmission status of the program information;

first multiplexing means for multiplexing the program information data generated by the program information data generating means with a plurality of pairs of encoded video signals and encoded audio signals;

second multiplexing means for multiplexing the multiplexed plurality of pairs of encoded video signals and encoded audio signals; and

control means for controlling a video data occupation bandwidth, an audio data occupation bandwidth, and a program data occupation bandwidth in relation to a transmission channel bandwidth; and

the information receiving apparatus comprising:

acquiring means for acquiring electronic program guide data only during a data transfer rate increase period;

separating means for separating the multiplexed program information; and

extracting means for extracting information of a transmission status of the program information that is included in the program information data separated by the separating means,

wherein the information receiving apparatus reads contents of a program information data of a current program and a next program at a re-transmission cycle of the program information data of the current program and the next program, and recognizes a transmission status of the program information data indicating broadcast schedules, and

wherein said control means of said information transmitting apparatus controls said program data occupation bandwidth to enable acquisition of program information in a reduced period of time by increasing transmission of program data when transmission of video data and audio data can be decreased.